

PROCEEDINGS OF LEARNED SOCIETIES.

ROYAL INSTITUTION.

Feb. 6, 1846.—Prof. Owen “On the Geographical Distribution of Extinct Mammalia.”

The Professor announced his purpose to develop the law or principle on which mammals are, and have been, distributed over the surface of this planet. [A mammal was described as being characterized by a hairy skin, quick respiration, and, therefore, a temperature usually higher than that of the surrounding atmosphere, and by bringing forth living young.] He stated that recent researches had led him to defined views on the following subjects:—1. *Comparative development as between mammals of the Old and New World.* 2. *Peculiarities of mammalian distribution in Australia and the neighbouring islands.* 3. *Probable final causes of several instances of this development.* 4. *Inquiry whether the extinct species of mammals were localized like the present races.*

Thus,—1. *On the comparative mammalian development in the New and Old World of geographers.* The Professor stated, that in the Old World mammals reached their highest type. Among other illustrations of this truth, he contrasted the lion and royal tiger of Asia and Africa with the puma and jaguar of America; the large and useful camel with the feeble vicugna. The most remarkable of the herbivorous and pachydermatous animals, as the giraffe and the antelope in the former class, and the elephant, rhinoceros, hippopotamus, babroussa, horse, djiggitas, zebra in the latter, are peculiar to the Old World. With respect to the rodent animals, water-rats, hares, rabbits, tailless hares, are only found in the Old World. The beaver is, indeed, represented by an American species, but this is distinct from the beaver of the Danube. The monkeys of the Old World are equally distinguishable from those of the New. In the latter we find the prehensile tail, the wide and approximated nostrils, and the absence of an opposable thumb on the hand.

Prof. Owen proceeded, 2ndly, to *notice the peculiarities of mammalian distribution in Australia and the neighbouring islands.*—In this tract of the globe all the animals are distinguished by two remarkable peculiarities, one positive and the other negative: (a) all are organized to carry about their young, from a very early period of embryonic life, in a portable pouch; and (b) none have attained a high degree of development. The largest marsupial carnivora are the *Thylacinus* and *Dasyurus*, which are respectively of the size of the dog and the wild cat.

3. *Probable final causes of several instances of this development* were then adverted to. Thus, the marsupial inhabits a country liable to long-continued drought, and where the indigenous animals are consequently compelled to make long journeys in search of water; were it not for the arrangement enabling the marsupial to carry its young with ease from one place to another, the races would probably become soon extinct. The prehensile tail of the American marsupial, as well as of the porcupine, kinkajous, ant-eaters, and monkeys of the New World, have reference to their arboreal life in the huge

forests in which these creatures live. Then, to prevent mischievous effects from the decomposition of vegetable matter in countries where it is so luxuriant, decaying plants furnish food to *Termites* and other insects, which, in their turn, support a peculiar genus of quadrupeds, the *Myrmecophaga* (or ant-eaters). In closing this part of his subject, the Professor noticed the armour-like, osseous skin of the armadillos, which live at the foot of trees, and are, therefore, extremely liable to blows from falling boughs, &c.

In other parts of the world, where vegetation is abundant, the quadrupeds related with it are generically distinct from those of South America. This adaptation of species to locality having impressed itself strongly on his mind in regard to the present globe, the Professor stated, that he early applied himself to inquire whether—
 4. *The extinct species of mammals were localized like the present races.*
 —For this purpose he formed a full and correct catalogue of the fossil remains of mammals in our island. He then gave a rapid sketch of the successive races of the extinct mammals, as they have been traced by the fossils in the ascending series of strata in England and Scotland. The first examples of this class are found in the limestone slate of Stonesfield, at the base of the middle oolite. These fossils were remains of small insectivorous, and probably marsupial, quadrupeds, associated with remains of beetles, vegetable fossils, shells, and fishes allied to the *Cestracion*. These recall many of the characteristic features of actual organic life in Australia. During the long period which followed the formation of the Stonesfield slate, and which has permitted the subsequent, successive, and gradual accumulation of enormous masses of sedimentary rocks, viz. great oolite, cornbrash, forest marble, Oxford clay, calcareous grit, coral rags, Kimmeridge clay, Portland stone, Wealden, gault, greensand, chalk, no trace of a mammalian fossil has been found. In England we first obtain evidence of that class of animals in the debris of some continent, poured out by vast rivers upon the surface of the chalk, forming masses 1000 feet in depth—the Plastic and London clays. Here are remains of great *Tapiroids*, as *Lophiodon* and *Coryphodon*, and smaller pachyderms, like peccaries—*Hyracotherium*. Here, with boa constrictors, are turtles, sharks, fossil palms, and other forms of tropical vegetation. At the same period there were alternating freshwater and marine deposits in continental Europe, filling up a vast excavation of chalk, called the Paris basin, and forming the foundations on which that city is built, analogous to the clays on which London stands. Here Cuvier first discovered and described the *Anoplotherium*, *Palæotherium* and *Cheropotamus*.

The Professor then briefly noticed the existence of similar calcareous freshwater and marine deposits in the Isle of Wight, and adverted to the discoveries of Mr. Allen and Mr. Pratt. It was, however, remarked, that little is gained by comparison of eocene and existing mammals, excepting so far as these indicate a great change in the distribution of earth and sea, and an accompanying alteration of climate. With the last layer of eocene deposits, we lose in England every trace of the peculiar mammals of that period. A vast series of geological operations took place, from which the miocene

strata resulted, before this country was again in a condition to sustain other mammalian races. Of these intermediate operations, and of the contemporary mammals, we have only the evidence of continental geology. We have in this country traces of one species of mastodon, found in the miocene crag-deposits of Norfolk. In process of time, when this island had become the seat of freshwater lakes, in which molluscous shells were deposited, and during the changes which converted lakes into river-courses, there were in these deposits and in contemporaneous local drifts, remains of mammalian fauna: the mastodon had disappeared; but, of the *Ungulata* were traces of mammoth, rhinoceros, hippopotamus, urus, bison, bos, *Megaceros*, *Strongyloceros*, *Hippelephas*, reindeer, roe, horse, ass, wild boar;—of the *Carnivora*: lion or tiger, *Machairodus*, leopard and cat—hyæna, bears, wolves and foxes, badger, otter, polecat, weasel;—of the *Insectivora*: bats, moles and shrews, *Palæospalax* (large shrew mole, now extinct);—of *Rodentia*: beavers, hares, rats and mice, lagomys (*Trogontherium*, extinct);—of *Cetacea*: cachelot, narwhal, grampus, whales.

The Professor then demonstrated, by the following proofs, that these remains had not been brought hither by any sudden and transient convulsion, but were relics of animals which had lived and died in this island in successive generations. 1. Vast numbers are found in tranquil freshwater strata. 2. The condition of the bones is not as if they had been triturated by the violence of waves, but their processes are perfect, and their outlines sharp and well-defined. 3. The great proportion of antlers proved to have been naturally shed, and these of different stages of growth, to the fossil bones of the deer, proves, beyond question, that generations of this animal must have passed their existence here. 4. The *Coprolites*, and other phenomena of Kirkdale Cavern, described by Dr. Buckland. Anticipating the question—how so many races of quadrupeds, now extinct, could have found their way hither—Prof. Owen gave a brief outline of the geological and zoological evidence, that England once formed a part of the continent from whence they came. The British Channel is, geologically speaking, of recent formation. At the time when England became an island, it is probable that the *mammoth*, rhinoceros, hippopotamus, &c. became extinct. This, though at a geologically recent period, was long before any historical records existed.

Prof. Owen adverted then to Dumarest's arguments in confirmation of this opinion, derived from the specific identity of the wolf and the bear of France, with the same animals historically known to have once infested our island; and he maintained that the races of some of our most familiar animals were coeval with the *mammoth*: two species of bats, mole, badger, otter, fox, wild cat, mouse, hare, horse, red deer, roe; and, on the continent, the reindeer, beaver, wolf, *Lagomys*; the aurochs of Russia, identical with an animal of the same kind in England. In the New World the same correspondence is singularly illustrated by the coincidence of the peculiarly zygomatic process and the dentition of the megatherium with that of the still living sloth. The *Armadillo* of South America is also similar to the high fossil *Glyptodon*. North America had its peculiar species of

mastodon; but, being connected with South America at its apex, and with Asia, by frozen seas, at its base, in accordance with this geographical condition, it was found that the mammoth of the Old World had migrated from the north, and the megatherium from the south, and that both had met in middle temperate regions of that continent. The fossil mammals of the newer tertiary period of Australia belong to the marsupial genera of *Kangaroo*, *Phalanger*, *Dasyurus*, wombat, &c., peculiar to the same country at the present day, but represented by species as big as the rhinoceros. A more remarkable example of the concordance of the existing and last extinct races of warm-blooded animals was afforded by the small peculiar and wingless bird (*Apteryx*) of New Zealand, and the extinct gigantic birds (*Dinornis*) from the superficial deposits of the same island. No remains of fossil quadrupeds have yet been found in New Zealand; and this country possessed no marsupial or other species of aboriginal quadruped when discovered by Captain Cook. From these and similar facts, the Professor drew the conclusion, that *the same peculiar forms of mammal quadrupeds and terrestrial birds were restricted to the same natural provinces at the later tertiary period as at the present day.* And as a corollary, *that the same general disposition of the larger bodies of land and sea then prevailed as at this time.* On the other hand, in carrying back the comparison of recent and extinct quadrupeds to the earlier tertiary period, indications were obtained of extensive changes in the relative position of land and sea, and, consequently, of climate; and that the deeper we penetrate the earth, or, in other words, the further we travel in *time* for the recovery of extinct mammals, the further we must travel in *space* to find their existing analogue. The *Tapir* of Sumatra or South America is the nearest living analogue of the eocene *Lophiodon*;—and the marsupial insectivores of Australia have, of all known animals, the nearest resemblance to the fossil *Phascolotherium* of our English oolites.—*Athenæum.*

ZOOLOGICAL SOCIETY.

Oct. 14, 1845.—William Yarrell, Esq., Vice-President, in the Chair.

“On the size of the Red Corpuscles of the Blood in the Vertebrata, with copious Tables of Measurements.” By George Gulliver, Esq., F.R.S.

The following Tables contain a synopsis of my former observations, corrected when necessary and extended by many more since made and now first published. They include altogether no less than 485 species, here systematically arranged, so as to exhibit a summary, and yet more complete view than any yet extant, of the size of the blood-corpuscles in the different subdivisions of vertebrate animals. In this respect I hope the Tables may be useful, as well as for reference in connection with physiological questions now often arising. I have introduced no measurement not made by myself. The observations on the form and size of the corpuscles, unless otherwise expressed, refer to the majority of them as existing in any portion of the blood of the adult animal spoken of; for there may be a few differing greatly from the average. In the blood-corpuscles of